

Remarks

Applicant's representatives have studied the application and reviewed the Examiner's rejection of the claims, which has been made on the basis of three pieces of art, U.S. Patents 4,055, 233 (Huntress), 4,658,931 (Curry) and 4,878,560 (Scott), and respectfully disagree with the Examiner's findings for the reasons set forth below.

The claims have been amended to correct formal matters and to further clarify the claimed structure. Support for the clarifying language of claim 6 is found in the last paragraph on page 31 and in Figure 26. Support for the clarifying language of claims 3, 8, 14, and 17 is found in Figures 3 and 13.

Before addressing the Examiner's rejection of the claims, Applicant's representatives would like to point out with greater particularity how the Applicant has chosen to describe the character of the material of the cushion employed in his invention.

Applicant has provided multiple ways to describe the material that forms a part of the claimed structure. He has done so in words and by the use of analytical expressions. With regard to how Applicant has chosen to characterize the material in words, Applicant's representatives would like to point out for the Examiner's benefit that the English word "plastic" can be either a noun or an adjective. As an adjective, one of the definitions associated with physics reads as follows:

As an adjective, one definition reads in part as follows:

"In physics, capable of continuous and permanent change of shape in any direction without breaking apart." (Webster's New World

Dictionary, Third College Edition, (1988), p. 1034.)

As a noun, the definition of “plastic” reads as follows:

“any of various nonmetallic compounds, synthetically produced, usually from organic compounds by polymerization, which can be molded into various forms and hardened, or formed into pliable sheets or films, fibers, flexible or hard foams, etc. for commercial use. . . .” (Id.)

In the as-filed claims of the present application, the first of these definitions is the appropriate definition. This definition is supported by the specification; see, for example, the first full paragraph on page 6 of the specification, where the term “plastically deformable” is defined. The detailed description of the invention on pages 13 - 18 expands on the definition of the intended meaning of “plastically deformable” and “partially plastically deformable”, and these terms are briefly defined in the first full paragraph on page 14, which also defines the term “at least partially plastically deformable” which is found in the claims. This is clearly distinguished from materials that are currently used for stethoscope earpieces (see page 18, second full paragraph), which are essentially elastically deformable.

With regard to the analytical terms that applicant has chosen to use to describe the material of his cushion, these are discussed at length in the application (see again pages 14 - 18 of the specification). In fact, Applicant has tried to tie these analytical limits to examples of materials which would have a damping ratio $\beta = C/C_c > 0.75$ and preferably greater than or equal to 1 (see the final paragraph of page 18, which carries over to page 19, for examples of representative materials).

In view of the above remarks and reading the claims in view of the specification, the following comments have been prepared to distinguish the present invention as set forth in the claims as-filed from the art cited by the Examiner. These remarks address the claims in the order that the Examiner lists them in his office action.

With regard to Point 2 of the office action, the Examiner maintains that Scott shows a noise barrier device as claimed in claims 16 and 17. Applicant and his representatives respectfully disagree to such an interpretation for multiple reasons. The present invention as claimed is felt to be patentably distinct based on geometric differences as well as based on the material selected for the cushion. The Scott patent does not teach, disclose, or claim a noise barrier device; in fact, the "earmold" of Scott would not provide a noise barrier as claimed in claims 16 and 17. The Scott earmold has a vent passage 21 therethrough which will allow the transmission of sound. The need for a noise barrier to avoid air leakage, such as the air leakage which the Scott vent passage is provided to allow, is pointed out in the second full paragraph on page 20 of the specification of the present application. It might also be noted that the Scott earmold is intended to provide support, and Scott does not address forming a noise barrier.

With regard to the Examiner's contention that Scott teaches a material which is at least partially plastically deformable in column 1 lines 63 -66, Applicant's representatives respectfully disagree. The section quoted by the Examiner states.

"Since the earmold is constructed of a relatively soft and flexible elastic plastic, such as styrene-rubber copolymer of softness about 42A, the earmold does have a memory and will tend to extend in a direction to achieve its at rest radius of curvature." (Column 1, lines 64-68, emphasis added.)

The wording of the present application not only specifies that the material is not elastic in its

physical properties, but also discusses the type of material described in the Scott patent, an elastic material, as being a prior art material (see page 18, second full paragraph) that does not provide satisfactory damping of noise.

It should also be noted that, unless the earplug is molded to match the contour of the ear, the elastic character of the earplug will cause the conical portion 9 to buckle, and this would create passages for sound leaks. As noted above, the need to avoid such leaks is discussed in the specification in the second full paragraph on page 20.

Scott also differs in the geometry of the device. With regard to claim 16, Figure 2 of Scott shows a conical portion (9) of an earmold having flange (5) extending therefrom for extending against the pinna with a side (7) adapted to fit against the crus helix (see column 1, lines 54-57) and, by their very nature, the flange and side (5, 7) do not encircle the ear canal entrance of the ear, and thus cannot be the claimed concha cushion of the present invention.

With regard to the Examiner's analysis of claim 17 referring to Figures 2 and 3 of Scott, the Examiner maintained that Scott shows an ear adapter body having, among other elements, an outer ear section (14, 5, 7) and a concha section with concha cushion (9). However, this analysis is inconsistent with the Examiner's analysis of claim 16 on which claim 17 is dependant, in which elements (5) and (7) were considered as forming the cushion. Furthermore, the conical section (9) is not the concha section *with concha cushion*, since there is no portion mounted to another as is set forth for the concha section and concha cushion in claim 17 as filed. Rather, conical portion (9) is a single, integral structure. Furthermore, claim 17 as currently amended more clearly points out that the concha cushion, in addition to being mounted to the concha section, is interposed between the concha section of the ear adaptor body and the concha region of the ear. Clearly the conical portion (9) of Scott shows no structure that would be so interposed.

With regard to Point 3 and the Examiner's analysis of Huntress, Applicant and his representatives again respectfully disagree with the Examiner's interpretation of this reference. First of all, contrary to the Examiner's representations, there is no suggestion in the Huntress patent that the material of the ear coupler be at least partially plastically deformable. The Examiner cites column 2, lines 43-44 for teaching such, but cites this text with regard to Scott. The citation from Huntress at this point states:

"In large measure it is the flexibility of the flange that effects the improved performance of this coupler." (Column 2, lines 43-44.)

The paragraph continues:

"Thus, it is fabricated of a very easily deformable rubber, one example of which is silicone rubber. This is preferably very soft, having a Shore A hardness index in the range of 21 to 28." (Column 2, lines 44-48.)

There is no indication from the Huntress patent that the material would be at least partially plastically deformable rather than elastic. In fact, if the material were at least partially plastically deformable, it would not have the flexibility that Huntress teaches for providing the improved performance. Rather, the material suggested by this description would have elastic, not plastic properties. It should also be noted that, in the Summary, Huntress states that:

"The flange, at least is fabricated from a low durometer nonplasticized *elastomer*."
(Column 1 lines 66-67, emphasis added.)

If the intention of the Examiner is to cite Scott at the same place for teaching a material

which is at least partially plastically deformable, then the citation is as follows:

“However, the earmold can be made of other plastic so long as the plastic is light enough to float and soft enough to be comfortable to the wearer.” (Column 2, lines 43-45.)

This statement only addresses the property of softness; as discussed above, earlier in the Scott patent the plastic has been defined as being elastic, which would assure that the plastic would not be either plastically deformable or at least partially plastically deformable as is claimed in the present application.

With regard to claim 17, the Examiner characterizes the acoustic flange (4) as being the claimed concha section with concha cushion; however, in claim 16 on which 17 is dependant, conical portion (2) has been defined by the Examiner as the cushion, thus creating an inconsistency.

Also, Applicant’s representatives do not comprehend the Examiner’s statement that Huntress teaches “the ear canal section (the body disposed within the ear canal as shown)”, since Huntress does not include any figure showing the ear canal or any element of the structure residing therein. Furthermore, accepting Examiner’s position that the outer ear section is (4, 5, 6) then (4) cannot also be the concha section with a concha cushion, as characterized by the Examiner.

It should be noted that, as currently amended, claim 17 more clearly points out that the concha cushion, in addition to being mounted to the concha section, is to be interposed between the concha section of the ear adaptor body and the concha region of the ear, and Huntress shows no structure that would meet this requirement.

With regard to Point 4 and the rejections based on Curry, Applicant and his representatives again respectfully disagree with the Examiner's position that Curry teaches the material as being at least partially plastically deformable. This is not the teaching of Curry and furthermore, the teaching of Curry is directed to providing an evacuated sealed chamber between the eardrum and an external source of intense sound (see column 2, lines 48 - 56) which is not the subject matter of the present invention. Furthermore, the text cited by the Examiner reads:

"The resilient pad members 120 and 122 may be fabricated of foam rubber, flexible plastic, inflated structures or other soft and pliable materials . . ." (Column 3, lines 27-29)

The characterization of the Curry pads as "resilient", which the dictionary describes as synonymous with "elastic", would not be consistent with a material which is plastically deformable or partially plastically deformable.

It should also be pointed out that the remarks made with respect to the claims cited by the Examiner also apply with equal force claims 1, 2, 5, and 6 which the Examiner has not chosen to cite under Point 4 but, for consistency, Applicant's representatives are bringing to his attention.

With regard to Point 6, the rejection by the Examiner of Claims 1-11 and 15-18 based on Curry in view of Huntress, Applicant's representatives again respectfully disagree with the Examiner's position. It is also unclear whether the Examiner intends to address these remarks to the claims identified in the office action. For example, in addressing claims 8-11 and 15-18, the Examiner's remarks address the feature of an ear adapter body, yet this is not a limitation of claims 10-11, 15-16, or 18. Similarly, the remarks address the connection to a stethoscope acoustic tube, which is not a limitation of claims 8, 10-11, or 15-18. The remarks below respond to the Examiner's bases for rejection, as they are best understood, regarding the claims identified

in the office action.

With regard to the rejection of claims 8-11 and 15-18, Applicants representatives would like to point out that while Curry does suggest that his device may be used with a stethoscope, this teaching is limited to column 6, lines 8 - 18. This teaching states that the coupling can be placed in the enclosed regions 108 and 110 of the shell member 104 and 106 and does not suggest that such could be placed in the ear canal. In fact, the only mention of the ear canal is made with respect to the embodiments shown in Figures 2 and 3, and here the ear canals (204, 304) are blocked by a hearing protection device (206, 306). In view of this limited teaching, Applicant's representatives respectfully disagree that there is any motivation in the references or the general knowledge of one skilled in the art to combine the two references. It should again be pointed out that Curry is directed to providing an evacuated sealed chamber between the eardrum and an external source of intense sound (see column 2, lines 48 - 56). Furthermore, the Examiner's position that it would be obvious to combine the in-ear device of Huntress with Curry is not supported by Curry. As pointed out above, Curry does teach embodiments which directly engage the ear (see Figures 2 and 3); however, these are designed to block sound, and would not be suitable for use with a stethoscope. Furthermore, the in-ear devices of Figure 2 and 3 have an evacuated chamber and this further distinguishes the structure of Huntress from Curry. Additionally, the in-ear devices taught by Curry lack the resilient pads employed in the ear-cup embodiment shown in Figure 1. Finally, none of the cited references teach a material that is at least partially plastically deformable, as required in claims 8-11 and 16-18, or a material having the damping ratio required in claim 15.

With regard to the rejection of claims 1-7, the Huntress teaching is limited to a very deformable rubber, providing silicone rubber as an example. Contrary to the Examiner's statement, Huntress does not mention silicon but suggests the use of silicone rubber. The present application does not suggest the use of rubbers and, in fact, soft rubbers which might well be

silicone rubber were cited as prior art materials (see page 18, second full paragraph, of the present application) which are insufficient for damping noise. Later on the same page, Applicant does discuss appropriate materials to include silicone gel filled with micro-spheres; putty; clay; silicon filled gel highly filled with clay (such as SillyPutty™) (see last paragraph on page 18 of the application). The application also discusses silicon gel or a high viscosity silicon liquid (or gel) in combination with a filler material on page 13 (see the second full paragraph).

Silicone rubber, as taught by Huntress, is not the material claimed in the present invention. It should also be noted that Applicant's representatives respectfully disagree with the assertion that Huntress teaches that the cushion material has to be strong enough to support the headsets, as stated under Point 6 of the action; this teaching is found in Scott, not in Huntress, and further points out that the Scott device is directed to supporting the device, rather than to providing a noise barrier.

With regard to Point 7, the Examiner rejects 1-11, 15, 17, and 18 based on Curry in view of Scott. As with the suggested combination of Curry and Huntress discussed above, Applicant's representatives respectfully disagree that there is any motivation to combine the teachings. Furthermore, Scott does not teach a noise barrier, as more fully discussed above, and thus would appear to be even less likely to be combined with Curry than would Huntress. Applicant's representatives also should point out for the benefit of the Examiner that, even if the references were combined, such a combination would not employ the materials specified in the claims and also would not have the structure of the claimed ear adapter body as set forth in claims 3-4, 8-9, and 17.

With regard to the Examiner's remarks on claims 8, 9, and 17 under Point 7, Applicant's representatives would again like to point out that, while Curry does suggest that his device may be used with a stethoscope, this teaching is limited to column 6, lines 8 - 18 which teach that the

coupling can be placed in the enclosed regions 108 and 110 of the shell member 104 and 106 and does not suggest that such could be placed in the ear canal. Again, the only mention of the ear canal is made with respect to the embodiments shown in Figures 2 and 3, and in these embodiments the ear canals (204, 304) are blocked by a hearing protection device (206, 306), and the device lacks any pad or cushion. Scott does not teach or suggest the claimed structure, as discussed above with regard to Point 2. With regard to the limitation that the material be at least partially plastically deformable, as discussed above, Scott teaches an elastic material, which would not be at least partially plastically deformable; in the ear-cup embodiment where Curry teaches the use of a pad, the pad is resilient, and thus would also not be at least partially plastically deformable. The Examiner also cites claims 7, 10-11, and 18 in this section, but gives no further explanation; to the extent that the Examiner's remarks are addressed to these claims, it is felt that the above comments on the lack of motivation to combine the references and the distinctions in material and structure apply.

With regard to the Examiner's remarks on claims 1-6 under Point 7, Scott teaches an elastic material which would not provide the claimed damping ratio. Furthermore, in view of the wide variety of physical properties found in plastics, the simple recitation of the use of plastic in Scott does not suggest the use of a plastic having any particular properties other than those which Scott specifies. Scott does not address the damping ratio of the material. Furthermore, since Scott teaches an earmold having a vent passage therethrough, there would be no motivation to make the Scott earmold from a noise damping material. This distinction would also appear to be relevant with regard to claim 15, for which the Examiner's action does not provide any remarks under Point 7, although the claim is cited.

With regard to Point 8 of the office action, the comments made above with regard to claims 1-6 under Point 7 apply to the rejection of claims 12-14 under Point 8 as well. Scott does not teach or suggest a noise damping material, and instead teaches the use of an elastic material.

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With particular regard to claim 14, Scott does not teach or suggest the structure of the claimed ear adaptor body.

With regard to Point 9 of the office action, the comments on the material of the Huntress device made above with regard to Point 6 apply to this basis for rejection as well. Huntress teaches a silicone rubber which would not have the damping qualities of the present invention, and does not teach the filled silicon gel or filled silicon liquid taught in the present application as suitable noise-damping materials. Furthermore, like Scott, Huntress teaches an elastic, not a noise damping material.

Applicant's representatives have responded to the Office Action based on their understanding of the Examiner's remarks and believe that the above response should place the application in condition for allowance. If there are any additional outstanding issues which the Examiner feels could be adequately addressed in a telephonic interview, Applicant's representatives would be willing to address these issues in such manner for the convenience of the Examiner.

Respectfully submitted,
Thomas F. Callahan

By: Michael J. Weins
Michael J. Weins
31 Bank Street
Lebanon, NH 03766
(603) 448-1922
Reg. No. 28,485